

The Effects of Mothers' Self-Efficacy on Children's Physical Activity

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Background: Physical activity has many health benefits, and numerous studies have shown the association between regular physical activity and prevention of about 25 chronic diseases. The guidelines recommend that everyone should try to make physical activity a part of their daily life in order to prevent the unhealthy consequences of sedentary behaviors.

Objectives: The aim of this study was to assess the effect of maternal self-efficacy on children's physical activity.

Patients and Methods: Inclusion criteria for schoolchildren were: studying at the 5th or 6th grade, relative body mass index of over 85 BMI, and having no restriction or prohibition for regular physical activity. Thus, a total of 300 schoolchildren with their mothers (600 participants) were recruited. To assess children's physical activity (CPA) and maternal physical activity (MPA) we applied the previous day physical activity recall (PDPAR) tool and the international physical activity questionnaire (IPAQ), respectively. Mother's self-efficacy (MSE) was measured using an eight-item standard questionnaire. Pearson's correlation test was applied to assess the relationship between MSE, MPA and CPA. To assess the predictor effect of MSE on CPA, the linear regression model was used.

Results: Means and standard deviations of age of children and their mothers were 11.2 ± 1.1 and 31.2 ± 3.4 years, respectively. Nearly half (46.5%) of the mothers had no formal education and most of them (58.5%) were housewife. There was a significant positive relationship between these three variables ($r(\text{CPA} \times \text{MPA}) = 0.748$, $r(\text{MPA} \times \text{MSE}) = 0.347$, $r(\text{CPA} \times \text{MSE}) = 0.433$, $P \leq 0.05$). The maternal physical activity explained approximately 56% ($R^2 = 0.559$) of physical activity performance in children (CPA).

Conclusions: Maternal physical activity affects children's physical activity, and is affected by mother's self-efficacy. Yet based on the findings of this study, regarding the role model effects of mothers in children aged 10-12 years, researchers proposed that interventions related to physical activity in children would work better if they are set to increase self-efficacy in mothers, which in turn lead to increased physical activity in children.

Keywords: Physical Activity; Parent; Children; Self Efficacy

1. Background

Physical activity has many health benefits, and numerous studies have shown the association between regular physical activity and prevention of about 25 chronic diseases (1-6). Thus, national and international health agencies and organizations have introduced some guidelines to increase community and public physical activity. The guidelines recommend that everyone should try to make physical activity a part of their daily life in order to prevent the unhealthy consequences of sedentary behaviors. However, studies have shown that many people do not meet the recommended levels of physical activity. For example, recent studies from the US have shown that over 63% of adolescents do not meet the daily physical activity guidelines of 60 minutes of moderate to vigorous physical activity (MVPA) (7-10).

Figures show that most children in many countries, developed or developing, do not meet the recommended levels of physical activity (11-15). Obesity and being overweight in children are two growing public health problems in many countries (15-19). Guthold, in a study on physical activity and sedentary behavior in schoolchildren at five World Health Organization (WHO) zones in

34 countries concluded that the majority of students did not meet physical activity recommendations (20).

In Iran nearly one out of three Iranian children is either obese or overweight with no significant variation with sex and age (21, 22). There are many factors contributing to childhood obesity and being overweight, yet sedentary behaviors are one of the major factors (6, 15, 23, 24). Sedentary behaviors including watching television and using computers and any activity with no or low amounts of movement that lead to low energy consumption (25, 26).

Family attitudes toward physical activity play an important role in increasing physical activity (PA) in children. The effects of family attitudes and preparation for school entrance exams on students' PA have been studied in some counties (27-31).

Many studies have been conducted to assess parental determinants of children's physical activity. Parents are the prominent role models for their children and initiate healthy behaviors. Family support, parental support and instrumental support are some main parental determinants of physical activity in children.

2. Objectives

The aim of this study was to assess the effect of maternal self-efficacy on children's physical activity.

3. Patients and Methods

3.1. Study Design

This cross-sectional analytical study was done as part of a PhD thesis on health promotion intervention that aimed to increase physical activity of schoolchildren who were overweight or obese. The Human Research Ethics Committee of the Tarbiat Modares University approved the study, and written informed parental consents and children assents were obtained for all subjects, prior to their participation in the study.

3.2. Samples

Inclusion criteria for schoolchildren were: studying at the 5th or 6th grade, relative body mass index of over 85, and having no restriction or prohibition for regular physical activity. Thus, a total of 300 schoolchildren with their mothers (600 participants) were recruited for the study from all primary schools of Qazvin province, Iran, using the simple randomized sampling method.

3.3. Measurements

3.3.1. Demographic and Relative Body Mass Index Measures

Socio-demographic characteristics of the participants, such as age, gender, grade, literacy, employment and ethnicity, were gathered by a questionnaire. Relative body mass index of schoolchildren were collected from school health profiles. Based on this profile, students with relative body mass index (RBMI) over the 85 percentile were selected and then their RBMI were calculated again with standard methods.

3.3.2. Physical Activity of Children

Physical activity of children was measured using the previous day physical activity recall (PDPAR) tool. The tool is a standard instrument with 30-minute time blocks. Some general activities are listed on the form, and participants enter the main activity that they had performed during each time period. To help participants select the correct level of intensity, the instrument provides pictorial representations of the four levels of relative intensity. Prior to the application of the PDPAR tool, we educated students on how to mark each block based on their own main activities.

3.3.3. Physical Activity of Mothers

Physical activity of mothers was assessed using the Per-

sian version of the international physical activity questionnaire (IPAQ). The daily energy consumption (MET) of the mothers was then calculated, using the IPAQ scoring protocol. Interviews were performed by a skilled and educated research colleague for participants who were illiterate and whose language was not Persian.

3.3.4. Mothers' Self-Efficacy

Self-efficacy of mothers was assessed using the physical activity self-efficacy scale questionnaire. This tool is an eight-item questionnaire, which was developed based on the study of Yan Liang. The second item states, "I can ask my parent or other adults to do physically active with me", however we changed it to "I can ask my husband or my brother". This modification has been done based on the socio-cultural status of the participants. Each item used a Likert scale ranging from one (completely disagree) to five (completely agree).

3.4. Analysis

All of the collected data were coded and entered in the SPSS software version 17 for analysis. Using descriptive statistical methods, demographic data were analyzed. The significance level was set two-tailed with $P \leq 0.05$. Differences between physical activity level of boys and girls were analyzed using the Chi-Square test. Bi-variate correlation test was performed to assess the correlation between CPA and MPA and MSE, consecutively.

Using the linear regression test we assessed the following model to determine the relationship between MSE, MPA and CPA. First, MPA regressed to MSE and determined the predictor level of MSE. Next, the total predictor effect of MPA and MSE on CPA was explored with the regression model.

4. Results

Demographic characteristics of the children and their mothers are shown in Tables 1 and 2. Means and standard deviations of age in children and their mothers were 11.2 ± 1.1 and 31.2 ± 3.4 years, respectively. Nearly half (46.5%) of the mothers had no formal education and most of them (58.5%) were housewife.

Distributions of children's physical activity based on gender, grade and RBMI variables are shown in Table 3. Based on the findings, obese children were significantly

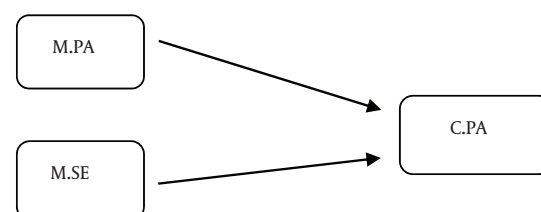


Figure 1. Conceptual model to describe the relation between M.PA, M.SE and C.PA

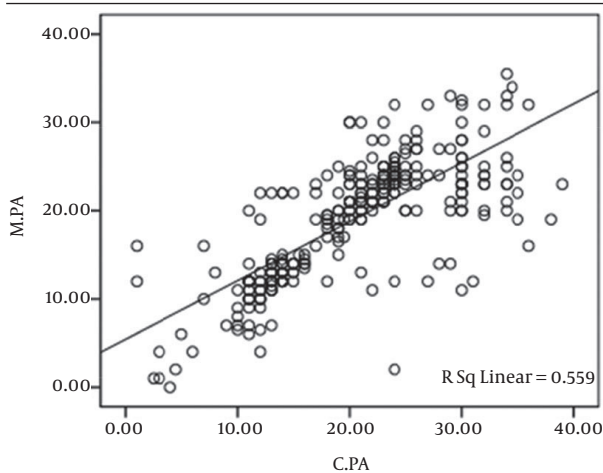


Figure 2. Correlation between Maternal Physical Activity and Children's Physical Activity

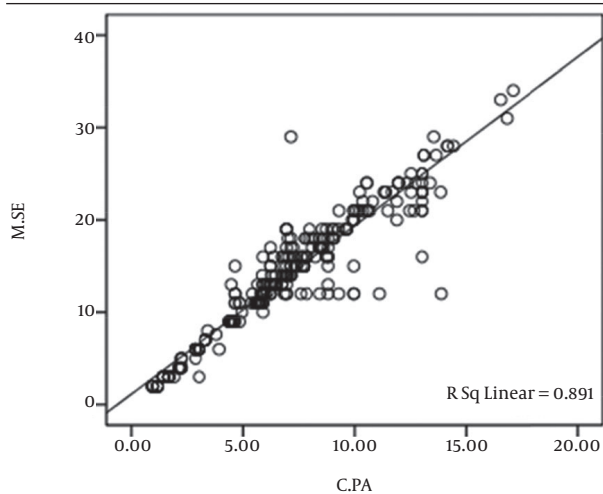


Figure 3. Correlation Between Maternal Physical Activity and Mothers Self-Efficacy

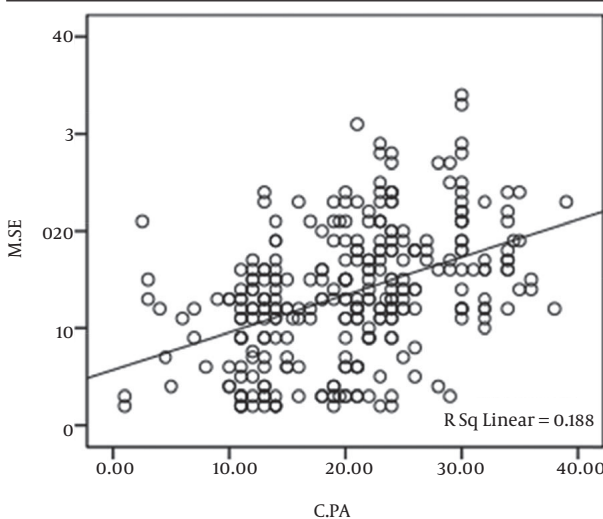


Figure 4. Correlation Between Mothers Self-Efficacy and Children's Physical Activity

Table 1. Demographic Characteristics of Children and Their Mothers

Variables	Value	Range, Yr
Children		
Age, yr ^a	11.2 ± 1.1	10.2-12.3
Gender		
Boy ^b	145 (48.5%)	
Girl ^b	155 (51.5%)	
School grade^b		
5 th	152 (50.5%)	
6 th	148 (49.5%)	
RBMI		
85-95 percentile	135 (45)	
≥95 percentile 6	165 (55)	
Mothers		
Age, yr ^a	31.2 ± 3.4	27-36
Education^b		
No formal school	140 (46.5%)	
High school or diploma	80 (26.5%)	
College degree	80 (26.5%)	
Employment^b		
Full or part time	125 (41.5%)	
Housewife	175 (58.5%)	
Ethnicity^b		
Azeri	105 (35%)	
Gilaks	75 (25%)	
Fars	120 (40%)	

^a Values are presented as Mean ± SD.

^b Values are presented as No.(%)

more active than overweight children (mean ± SD; 5.1 ± 0.9 vs. 4.6 ± 1.1) ($P \leq 0.05$), and boys had more physical activity than girls (5.5 ± 0.422 vs. 4.2 ± 0.9) ($P \leq 0.05$). Finally, there was a significant difference between means of physical activity in the two proposed grades ($P \leq 0.05$). Students in grade 6 had less physical activity than those in grade 5 (mean ± SD; 5.0 ± 0.22 vs. 4.3 ± 0.3).

The association between CPA, MPA and MSE was assessed using Pearson's correlation test. Pearson's correlation test discovered a significant positive relationship between these three variables (r (CPA × MPA) = 0.748, r (MPA × MSE) = 0.347, r (CPA × MSE) = 0.433, $P \leq 0.05$). The pictorial exhibitions of these relations are shown in Figures 2, 3 and 4.

Children's physical activity was regressed on MPA in step 1, and MPA and MSE in the next step. Both models were statistically significant (Model 1; $F = 38$, $P = 0.005$, $R^2 = 0.559$ and Model 2; $F = 21$, $P = 0.004$, $R^2 = 0.594$). In model 1, MPA explained about 56% ($R^2 = 0.559$) of the physical activity performance of children (CPA).

Table 2. Distribution of Children's Physical Activity by Relative Body Mass Index, Grade and Gender

C.PA	Mean \pm SD	t test ^a
RBMI		0.000
85-95	4.6 \pm 1.1	
≥ 95	5.1 \pm 0.9	
Gender		0.000
Male	5.5 \pm 0.422	
Female	4.2 \pm 0.9	
Grade		0.000
5th	5.0 \pm 0.22	
6th	4.3 \pm 0.3	

^a t test shows significant differences between PA based on RBMI, grade and gender.

Table 3. Summary of Regression Analysis for Variables Predicting C. PA

Variables	B	SE B	β	P value
Step 1				
M.PA	0.389	0.043	0.748	0.03
Step 2				
M.PA	0.762	0.044	0.679	0.04
M.SE	0.221	0.044	0.198	0.01

5. Discussion

As parents play an important role to initiate healthy behaviors in children, parental effects on children's physical activity have been assessed by many studies (14, 18, 30, 32). Generally, parental activity pattern and self-efficacy have been considered as the two main predictors for CPA. For this reason, many health promotion interventions have focused on parental determinants of physical activity to increase children's physical activity. Most studies have discovered differences between parental (paternal/maternal) determinants.

Our study revealed that obese children had more physical activity than overweight children (Table 3). This means that increasing RBMI is accompanied by increasing physical activity. Although, most studies have discovered a negative relationship between RBMI and physical activity (33, 34), still some have reported that obese children have a high tendency to exaggerate and overestimate their physical activity, especially in recall tool application (33, 35).

On the other hand, students at the 6th had less physical activity than those at the 5th grade (Table 3). Students at the 6th grade were going to sit hard examinations to enter outstanding schools. Thus, learning had a competitive effect on physical activity. Some studies regarded learning and other cognitive performance achievements as a barrier for physical activity (36-38).

Our study examined the effects of maternal self efficacy

on children physical activity. Based on the findings, there was a positive correlation ($r = 0.75$) between MPA and CPA (Figure 2). Some other studies have discovered similar associations between parental physical activity and children's physical activity (39-41). However, our study showed that for children between 10-12 years, mothers could be powerful role models to initiate physical activity; the regression model revealed that MPA by itself could predict about 56% of physical activity in children. These findings are consistent with the results of review study about maternal determinants of physical activity in children (14, 42, 43).

Mother's self-efficacy by itself predicted 0.22% of variation in children's physical activity. In summary, maternal physical activity affects children's physical activity, and is affected by mother's self-efficacy. Yet based on the findings of this study, regarding the role model effects of mothers in children aged 10-12 years, researchers proposed that interventions related to physical activity in children would work better if they are set to increase self-efficacy in mothers, which in turn lead to increased physical activity in children.

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Authors' Contributions

Kazem Hosseinzadeh: study design and measurement of variables. Prof. Shamsaddin Niknami: data entry in SPSS and analysis of data. Prof. Alireza Hidarnia: academic writing, analysis of data, regression model.

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